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basic imagery interpretation report

Wuxing (Wu-hsing) Missile Propulsion R&D Center (S)

STRATEGIC WEAPONS INDUSTRIAL FACILITIES

PRC

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INSTALLATION OR ACTIVITY NAME					COUNTRY
Wuxing (Wu-hsing) Missile Propulsion Research and Development Center					CH
UTM COORDINATES	GEOGRAPHIC COORDINATES	CATEGORY	BE NO	COMIREX NO	NIETB NO
NA	30-44-50N 120-01-35E				
MAP REFERENCE					

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ACIC. USATC, Series 200, Sheet 0492-6, scale 1:200,000

LATEST IMAGERY USED	NEGATION DATE If required:
	NA

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ABSTRACT

1. (TSR) Imagery-derived analysis of the Wuxing (Wu-hsing) Missile Propulsion Research and Development Center, People's Republic of China (PRC), indicates that the center, when operational, may be involved in the development and testing of a follow-on space-launch vehicle to the CSS-X-4/CSL-2 missile system (a two-stage liquid-propellant vehicle). The follow-on vehicle would probably be configured with a liquid-propellant rocket engine and solid-propellant booster motors. The observation of type M propellant vehicles at one of the liquid-propellant storage buildings suggests that the CSS-X-4/CSL-2 is associated with the rocket engine test stand. The recent construction of four composite propellant batch-mix buildings, each capable of holding vertical mixers with a maximum 300-gallon capacity, also suggests that the rocket motor development area in the northwest portion of the center may become involved in the development and production of composite propellant booster motors for a new vehicle. However, the current lack of casting/curing, finishing, and assembly buildings in relation to the potential propellant mix capacity of the plant suggests either that the program is in its infancy with the necessary support facilities forthcoming or that the center will only be involved in the developmental phase and not in series production of the motors.

2. (U) This report updates the previous NPIC report [] dated November 1972, and describes changes observed in each of the areas at the facility. Five annotated photographs, one map, and four tables are included in this report.

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INTRODUCTION

3. (TSR) The Wuxing Missile Propulsion Research and Development (R&D) Center is in the foothills of a low mountainous area, 9 nautical miles (nm) south of Wuxing, 25 nm north of Hangzhou (Hang-chou), and about 80 nm west-southwest of Shanghai (Shang-hai; Figure 1). This facility consisted of six functional areas—a rocket engine test area (including propellant storage), a rocket motor test area, a rocket motor development area, a development and test support area, a utility support area, and a housing area (Figure 2).

4. (TSR) Observations at Wuxing indicate that when the center becomes operational, it may be involved in the development and testing of a follow-on space-launch vehicle to the CSS-X-4/CSL-2, configured with a liquid-propellant rocket engine and strap-on, composite propellant booster motors. In a recent visit by a PRC delegation to a National Aeronautical Space Administration facility, the Chinese expressed a desire to develop an indigenous, space-launch booster motor capability and demonstrated a great interest in specifics on the Delta-class rocket.¹ The Delta contains a two-stage, liquid-propellant rocket engine with solid-propellant, strap-on booster motors. The collocation of a liquid-propellant rocket engine test area with a composite propellant rocket motor development and test area make the center a suitable facility for the development of such a vehicle.

5. (TSR) The significant expansion of both the composite propellant mix capability and the housing and support areas in association with the testing capability of the horizontal test cell suggests the possibility that composite propellant booster motors may be fabricated in the rocket motor development area of the Wuxing facility. In addition, the presence of type M propellant vehicles, which are associated with the CSS-X-4/CSL-2 missile system, indicated that a CSS-X-4/CSL-2-class engine may have been tested at the vertical test stand.

6. (TSR) Other installations which may be related to the Wuxing Missile Propulsion R&D Center are Sonjiang (Sung-chiang) Guided Missile Production Plant [], approximately 65 nm northeast of the center, and the Shanghai Guided Missile Production Plant Minhang (Min-hang, BE []), approximately 75 nm northeast of the center.² A rail transloading area, under construction 2.5 nm north-northwest of the center, may serve as a rail-to-road transfer point. These facilities are connected by all-weather roads to the Wuxing installation.

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BASIC DESCRIPTION

Rocket Engine Test Area

7. (TSR) Construction on the vertical test stand appeared to be nearly complete in August 1979. The roadway serving the vertical test stand was being surfaced with concrete. The area around the test stand has been cluttered continually and since November 1973, two large, discarded, possible run tanks have been on the ground behind the test stand. The large construction crane had been dismantled with the lattice boom sections stacked in the clearing to the rear of the test stand.

8. (TSR) The activity level associated with the vertical test stand indicates that the test stand may have been operational since 1973 in spite of its unfinished appearance. Evidence that the test stand may have been operational was provided on several occasions by the presence of type M propellant vehicles and type D propellant kegs at the two propellant storage buildings (items 6 and 18, Figure 3 and Table 1). Type M propellant vehicles were observed next to the northern propellant storage building (item 18) on two occasions, in October 1973 and February 1974, and possibly on a third occasion in August 1979. Type M propellant vehicles were observed in front of the five-bay garage in the utility support area in November 1977, August 1978, and August 1979. During the same time period, unusual fluctuations of the water

level in the test stand exhaust trough were observed, indicating that the deluge system had probably been used. The presence of the propellant vehicles, which are associated with the CSS-X-4/CSL-2 missile system, along with the water level fluctuations indicated that a CSS-X-4/CSL-2-class engine may have been tested at the vertical test stand. Burn marks, rocket engines, or rocket engine dollies have not been identified at the vertical test stand.

9. (TSR) Type D propellant kegs have been seen on numerous occasions on the parking apron adjacent to the southern liquid-propellant storage building (item 6, Figure 3 and Table 1). Although no definite missile system association has been established for the type D keg, the simultaneous observations of the type D kegs and the type M vehicles at Wuxing in October 1973, November 1977, and again in August 1979 indicate that the type D kegs and the CSS-X-4/CSL-2 engine may be associated.

Rocket Motor Test Area

10. (TSR) The rocket motor test area was the first area at Wuxing to be externally complete (April 1972). By October 1973, an in-plant rail spur connected the test cell to the test article prepara-

(Continued p. 6)

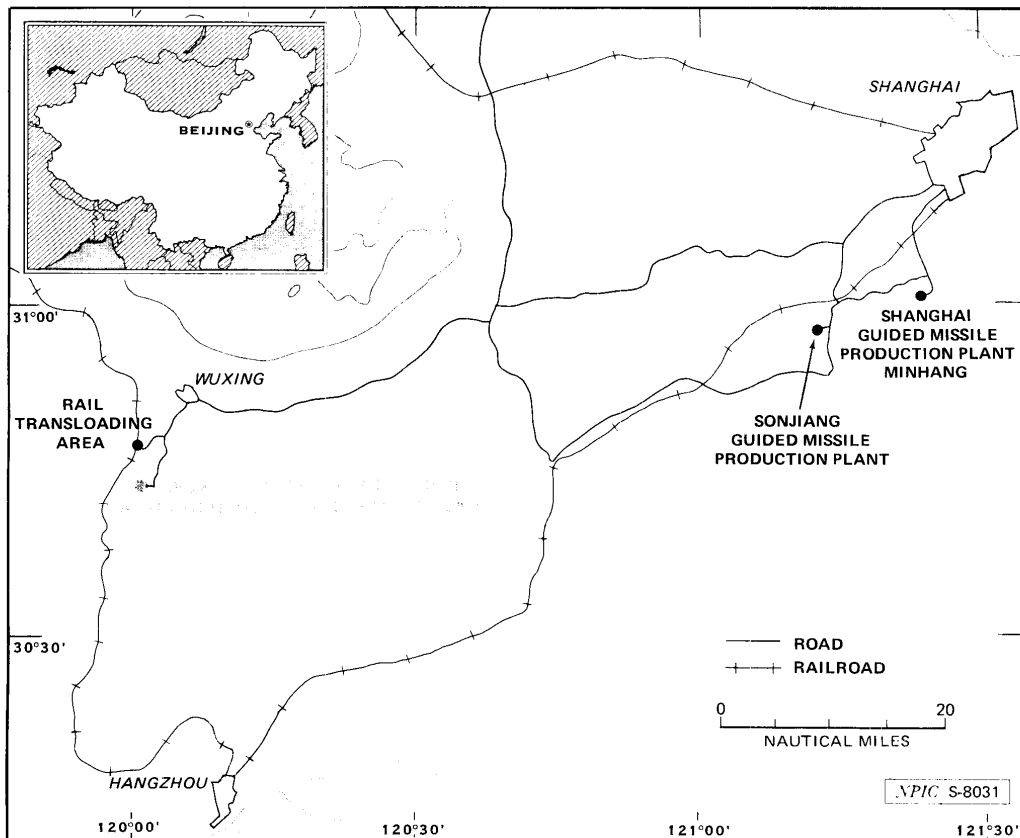


FIGURE 1. LOCATION OF WUXING MISSILE PROPULSION R&D CENTER, PRC

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Table 1
Rocket Engine Test Area (Keyed to Figure 3)

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Item	Description	Dimensions* (m)	
		L	W
1	Prob storage bldg		
a			
b			
2	Support bldg		
a			
b			
c			
d			
3	South liquid-propellant storage bldg		
a			
b			
4	Type D propellant kegs (approx diam)		
5	Pumphouse		
6	North liquid-propellant storage bldg		
a			
b			
7	Cylindrical storage tank		
8	Propellant line		
9	Vertical test stand		
10	Crane foundation		
11	Crane lattice boom sects		
12	Poss discarded run tanks (2)		
13	Prob high pressure gas storage bldg (temporary roof)		
14	Test support bldg		
15	Control & instrumentation bldg		
16	Propellant line		
17	Pumphouse		
18	Liquid-propellant storage bldg		
19	Prob deluge water storage bldg		
20	Instrumentation bldg		
21	Instrumentation bldg		
22	Test support bldg		
23	3 cylindrical storage tanks		

*Dimensions, except where given, are contained in NPIC report
 [] dated Nov 1972.

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tion building (items 2, 3, and 5, Figure 4). No hot-fire rocket motor testing has been confirmed at this cell; however, in April 1978, four probable test article dollies were on the in-plant rail spur, and a discoloration, possibly a faint blast mark, extended approximately 25 meters from the edge of the test cell.

Rocket Motor Development Area

11. (TSR) The most significant development at Wuxing since November 1972 has been the construction of four composite propellant batch-mix buildings (items 32—35, Figure 5 and Table 2), two associated mix control buildings (items 36 and 37), and a probable radiographic test/finishing building (item 31) in an area adjacent to and northwest of the original rocket motor development area. Excavations and site preparations for the new buildings were first observed in September 1975. A two-year hiatus in activity then followed with construction resuming in late 1977.

12. (TSR) The new batch-mix buildings closely resemble a reconstructed batch-mix building at Hohhot (Hu-ho-hao-te) Solid Propellant Complex [] in northeast China.³ Both the Wuxing and the Hohhot mix buildings are 12.5 by 11.1 meters overall with the high-bay portion of the Wuxing buildings being [] high; the Hohhot mix building is [] high. The Hohhot Complex is comparable in layout and function to the Thiokol Chemical Corporation

Wasatch Division, near Brigham City, Utah.⁴ The mix buildings at the Thiokol plant, [] high, contain 300-gallon (40.11 cubic feet) vertical mixers. The minimum interline distance between the mix buildings at Wuxing is [] more than sufficient for the 4,400-pound propellant capacity of 300-gallon mixers. The similarities observed among the new mix buildings at Wuxing and the mix buildings at Hohhot and the Thiokol Plant suggest the possibility of vertical mixers in these buildings with a capacity of at most 300 gallons.

13. (TSR) A comparison of the casting/curing capacity at Hohhot and at Wuxing, however, indicates that Wuxing in its present configuration lacks a casting/curing capacity sufficient to handle its propellant mix potential. The two buildings (items 2 and 3, Figure 5), which have been identified as having a probable casting/curing function, contain an estimated floorspace of 875 square meters. An estimated casting capacity for Hohhot at the time of the reconstruction of its mix building is 4,300 square meters. Because casting/curing facilities are generally positioned near propellant mix buildings, a possible location for a casting building (item 38, Figure 5) to accommodate the mix potential at Wuxing would be along the loop access road to the new mix area.

14. (TSR) In addition, separate areas at the Hohhot complex have been identified for component fabrication and assembly and for rocket motor finishing and inspection. These functions are necessary for a complete series production

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Table 2
Rocket Motor Development Area (Keyed to Figure 5)

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Item	Description	Dimensions (m)			Item	Description	Dimensions (m)			Item	Description	Dimensions (m)		
		L	W	H			L	W	H			L	W	H
1	Office support bldg				14	Lab processing bldg				24	Prob fuel binder prep bldg			
a					15	Ingredients prep bldg				26	Prob components assem storage bldg			
b					a					a				
2	Prob casting curing bldg				b					b				
a					c					27	Prob components assem storage bldg			
b					16	Warehouse				a				
3	Prob casting curing bldg				17	Lab support bldg				b				
a					18	Lab support bldg				28	Prob bks (3 stories)			
b					a					29	Support bldg			
4	Prob mandrel prep bldg				b					30	Lab processing bldg			
5,6	Mix bldg				c					a				
7	Mix support bldg				19	Prob case prep bldg				b				
a					a					31	Prob radiographic test finishing bldg			
b					b					a				
8	Poss small motor finishing bldg				c					b				
9	Prob ingredients storage bldg				20	Inert operations bldg				c				
10	Poss small batch test bldg				21	Support bldg				32-35	Batch-mix bldgs			
a					22	Prob propellant premix bldg				a				
b					23	Prob oxidizer prep bldg				b				
11	Assem processing bldg				a					c				
a					b					36, 37	Mix control bldgs			
b					c					38	Poss future location of casting curing area			
12	Support bldg				24	Prob oxidizer prep storage bldg								
13	Lab processing bldg				a									
a					b									
b														
c														

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Table 3
Structures in Support Areas (Keyed to Figure 6)
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Item	Description	Dimensions (m)		Item	Description	Dimensions (m)	
		L	W			L	W
Housing Area				30	Support bldg		
1- 2	Apartment bldgs (4 stories)			a			
				b			
10	Prob garage			31	Prob warehouse (ucon)		
11	Barracks (2 stories)			32	Shop bldg		
12	Utility support bldg			33	Construction support bldg		
				34	Support bldg		
				a			
				b			
13	Support bldg			35	Support bldg		
14	Prob workshop bldg			36	Warehouse		
				a			
				b			
15	Barracks (3 stories)			37	Support bldg		
16- 18	Barracks (3 stories)			38	Support bldg		
19	Messhall			39	Support bldg		
				a			
				b			
20	Barracks (3 stories)			40	Steamplant		
Utility Support Area				41	Garage		
21	Garage			a			
				b			
				Development and Test Support Area			
	Workshed			42	Warehouse		
22	Office bldg			43	Prob components storage bldg		
23	Vertical tanks (2)			44	Prob components assem bldg		
				45	Lab processing bldg		
24	Vertical tank			a			
				b			
25	Shop bldg			46	Prob lab support bldg		
				47	Quarters /admin bldg		
				48	Electrical substation		
26	Support bldg			49	Office /support bldg		
27	Support bldg			a			
28	Warehouse			b			
29	Warehouse						

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program. Similar facilities of sufficient capacity to support the propellant mix potential at Wuxing have not been identified.

Support Areas

15. (TSR) All of the support areas have been expanded significantly since November 1972. The construction of processing, assembly, warehouse, and office buildings has more than doubled the amount of available floorspace in the development and test support (formerly warehouse) area and in the utility support area (Figure 6). Since November 1972, the addition of nine multistory apartment buildings (items 1—9, Figure 6 and Table 3) and two multistory barracks (items 11 and 15) has nearly tripled the amount of housing floorspace, making approximately 13,800 square meters available.

Imagery Analyst's Comments

16. (TSR) The role of the Wuxing R&D Center in the PRC missile/space launch program remains unclear. The Wuxing center is unusual in that a liquid-propellant rocket engine test area is collocated with a solid-propellant rocket motor development and test area. Although no missile system has been firmly associated with Wuxing, the vertical test stand is capable of testing rocket engines of first-stage ICBM or space-booster size.² The horizontal test cell is similar in size and configuration to test cell one at Hohhot.⁵ Because first-stage, submarine-launched, ballistic missile motors have been tested at Hohhot test cell 1, the Wuxing horizontal test cell should be capable of testing motors of at least that size.

17. (TSR) The presence of the type M propellant trucks in the rocket engine test area, as previously mentioned, indicates a possible CSS-X-4/CSL-2 missile system association. Further support for an ICBM/space launch function for Wuxing is the existence of two known CSS-X-4/CSL-2 facilities in the Shanghai area, approximately 80 nm northeast of the Wuxing R&D Center.² At the Sonjiang Guided Missile Production Plant, road transporters for the first and

second stages of the CSS-X-4/CSL-2 missile system have been observed intermittently from July 1971 to the present. Missile rail transporters for the CSS-X-4/CSL-2 were first seen in August 1978 at Shanghai Guided Missile Production Plant Minhang, and both CSS-X-4/CSL-2 missile railcars and road transporters were present at the plant in May 1979. Both of these installations are connected by improved all-weather roads with the Wuxing R&D Center (Figure 1).

18. (TSR) Associating Wuxing only with the CSS-X-4/CSL-2, however, would not account for the presence of the composite propellant capability at the R&D center. An hypothesis which accommodates both the solid and liquid capabilities is that the Wuxing Center, when fully operational, will be involved in the development of a follow-on space launch vehicle to the CSS-X-4/CSL-2, which would be configured with a liquid-propellant rocket engine and strap-on, solid-propellant rocket booster motors.

19. (TSR) The expansion of the propellant mix, housing, and support areas at Wuxing suggests that a new or modified missile/space launch vehicle is under development. But, the fact that construction has not yet begun on a casting/curing building capable of accommodating the propellant mix potential implies that the program is in its infancy. Initiation of construction of additional casting/curing facilities would then be an indication that the development program is well underway.

20. (TSR) Another possibility, however, is that the rocket motor development area will only be involved in the developmental phase of the booster motors and not in series production. In this case, the existing casting/curing facilities (items 2 and 3, Figure 4) may be sufficient to handle the additional mix capacity provided by the four new batch-mix buildings. The four new mix buildings may be necessary to insure that a sufficient amount of propellant mix is available when a specific size rocket motor is being cast. Additional support for this theory is the current lack of sufficient fabrication, assembly, finishing, and storage buildings to sustain series production of the motors.

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(TSR) All applicable KEYHOLE imagery from []
[] was used in the preparation of this report.

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MAPS OR CHARTS

ACIC. US Air Target Chart, Series 200, Sheet 0492-6, scale 1:200,000 (UNCLASSIFIED)

DMA. Series ONC, ed 1, Sheet H-12B, scale 1:500,000 (UNCLASSIFIED)

DOCUMENTS

1. CIA. FIR-321/00565-79, Intelligence Information Report, Apr 79 (CONFIDENTIAL)
2. NPIC. [] PIR-042/78, *Probable Space-Launch Association of Shanghai Missile Production Complex, PRC (S)*, Oct 78 (TOP SECRET []) 25X1
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3. NPIC. [] SR-086/77, *Resumption of Composite Propellant-Related Activity in China* [] Dec 77 (TOP SECRET []) 25X1
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4. NPIC. [] RCA-09/0002/76, *Hu-ho-hao-te Solid Propellant Complex*, Aug 75 (TOP SECRET []) 25X1
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5. NPIC. [] RCA-09/0024/73, *Wu-hsing Missile Propulsion Research and Development Facility (Wu-hsing Rocket Engine Test Facility)*, Nov 72 (TOP SECRET []) 25X1
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REQUIREMENT

COMIREX J02
Project 290007DJ

(S) Comments and queries regarding this report are welcome. They may be directed to []
[] Asian Forces Division, Imagery Exploitation Group, NPIC, []

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